



Broward County Florida

Near-Road Monitoring – Pilot Study

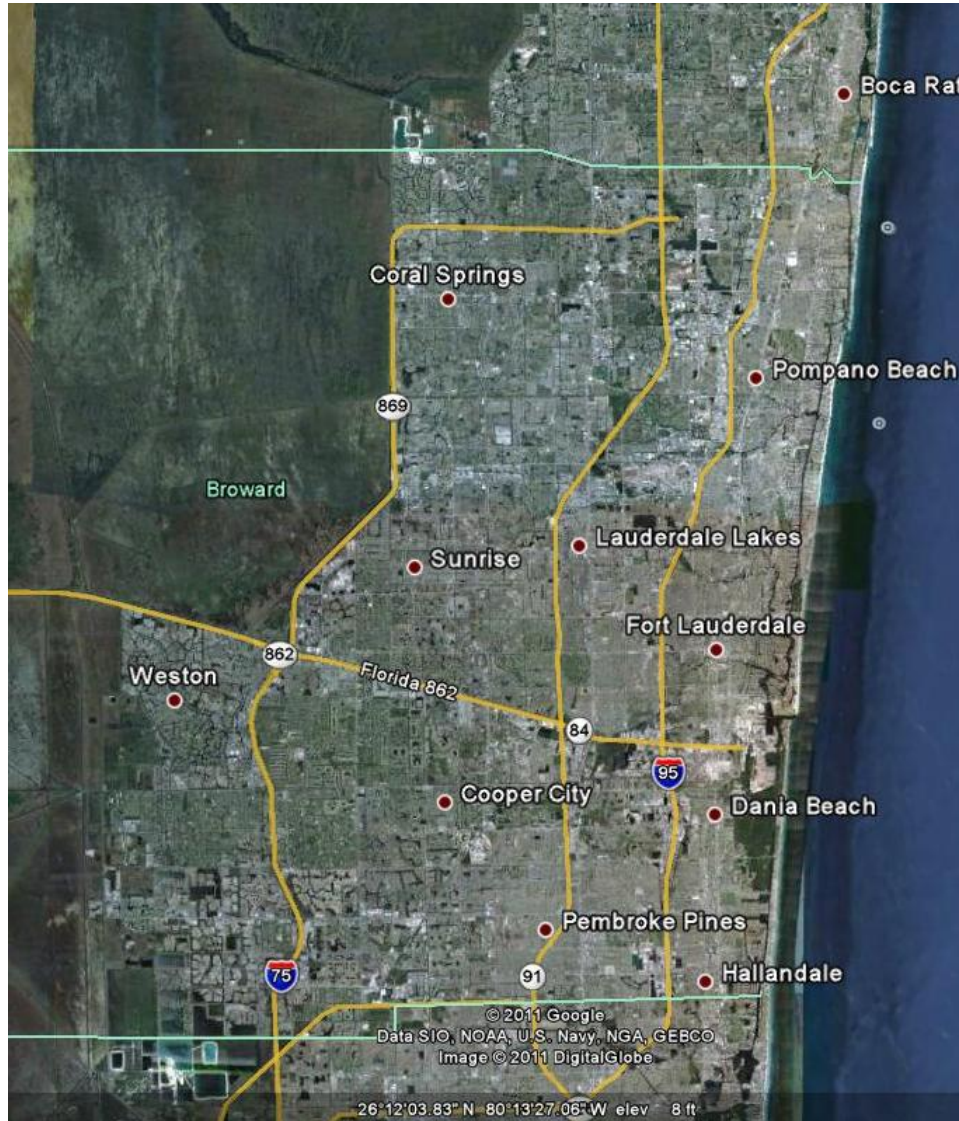
Presenter - Monica K. Pognon

Ambient Air Monitoring Section - Pollution Prevention Remediation and
Air Quality Division

National Air Quality Conference – Ambient Monitoring 2012

May 15, 2012 – Denver, Colorado

Broward County, Florida



- Population : 1.75 million residents; over 10 million visitors
- Five major interstates
 - I-95 – running north and south east side of the county.
 - I-595 – running east and west
 - I-75 – west side of the county
 - Florida Turnpike – running north and south parallel to I-95.
 - Sawgrass expressway – east of the everglades
- Miami/Fort Lauderdale/Palm Beaches CBSA

Near Roadway Monitoring

- New Monitoring Requirement
- Strategy
 - Contact the Local FDOT Office in Fort Lauderdale
 - Discuss project, rule, concerns, process
 - Contact Broward County Construction Management
 - Bring all the players to the table
 - County Attorney, Purchasing, Real Properties, Risk Management

Near Roadway Monitoring

- Pre-planning started in January 2011
 - Estimate cost of equipment
 - Cost of construction
 - Develop a “realistic” timeline
- Secure funding from EPA

Miami/Ft. Lauderdale/Palm Beach CBSA :Top 20 ModAADT, using local AADT and local HD counts

COSITE	ROUTE	DESC FRM	DESC TO	AAD T Rank	AADT	HD Rank	HD	ModAADT	County
862499	I-95	SR 842/BROWARD BLVD	SR 838/SUNRISE BLVD	1	306000	2	35129	622161	Broward
862493	I-95	SR 84 EB	SR 736/DAVIE BLVD	2	299000	7	16624	448616	Broward
862493	I-95	SR 818/GRIFFIN RD	86095000/EB-I595	2	299000	7	16624	448616	Broward
862493	I-95	86095000/EB-I595	SR 84 EB	2	299000	7	16624	448616	Broward
862498	I-95	SR 736/DAVIE BLVD	SR 842/BROWARD BLVD	3	296000	10	16458	444122	Broward
862455	I-95	SR 822/SHERIDAN ST	SR 848/STIRLING RD	4	281000	16	15624	421616	Broward
862500	I-95	SR 838/SUNRISE BLVD	SR 816/OAKLAND PARK	5	276000	20	15346	414114	Broward
870572	SR-826	N/A	Bridge No-870964	9	260000	11	16380	407420	Miami-Dade
862458	I-95	SR 848/STIRLING RD	SR 818/GRIFFIN RD	6	270000	23	15012	405108	Broward
862394	I-95	SR 824/PEMBROKE RD	SR820/HOLLYWOOD BLVD	7	267000	25	14845	400605	Broward
862454	I-95	SR820/HOLLYWOOD BLVD	SR 822/SHERIDAN ST	8	266000	26	14790	399110	Broward
862504	I-95	SR-814/ATLANTIC BLVD	COPANS RD	16	224000	5	17875	384875	Broward
862501	I-95	SR 816/OAKLAND PARK	SR 870/COMMERCIAL	7	267000	55	11454	370086	Broward
932191	I-95	Bridge No-930189	CONGRESS AVE	24	194000	4	18818	363362	Palm Beach
932191	I-95	N/A	Bridge No-930189	24	194000	4	18818	363362	Palm Beach
932191	I-95	PALMETTO PARK RD	N/A	24	194000	4	18818	363362	Palm Beach
862502	I-95	CYPRESS CREEK RD	SR-814/ATLANTIC BLVD	15	225000	24	15008	360072	Broward
862502	I-95	SR 870/COMMERCIAL	CYPRESS CREEK RD	15	225000	24	15008	360072	Broward
860331	I-95	SR 858/HALLANDALE	SR 824/PEMBROKE RD	11	236138	39	12704	350474	Broward
862487	I-95	DADE CO. LN.	SR 858/HALLANDALE	12	232000	37	12899	348091	Broward

Phase I - Passive Monitoring

- Selected 6 locations
 - PSD #1 – I-95 SB north of Atlantic Blvd (High HD Traffic Counts)
 - PSD#2 – I-95 SB south of Sunrise Blvd (High ModAADT, proposed permanent site and transect site).
 - PSD #3 – I-95 NB south of Sunrise Blvd
 - PSD #4 – I-95 SB north of Stirling Road
 - PSD #5 – I-95 SB north of Pembroke Road
 - PSD #6 – Site 25 Dania Beach (NO₂, Ozone, Atox)

Phase I - Passive Monitoring

- Timeline
 - Applied for General Use Permit with FDOT
 - Submit March 15th
 - Received permits May 5th
 - Constructed and installed samplers
 - Installation complete May 13th
 - Passive monitoring
 - May 16th – June 20th



Phase I – Passive Monitoring

- 5 week study
- 6 locations (including 1 transect site and 1 collocated)
 - 2m in height level to roadway (PSD)
 - Distance from the roadway 15.24m
 - Transect 15.24m, 19.8m and 24.38m
- NO₂ and NO_x samples collected
 - Total 100 samples
 - Collocated
 - Trip & Field blanks



Phase I – Passive Monitoring

Site Code	Site Name	Road Segment	AADT	AADT Rank	FE-AADT ^b	Heavy Duty	FE-AADT Rank	Distance from road (m)	Height (m)
DBH	Dania Beach	I-95 & Stirling Road	270,000	6	405,108	15,012	7	15	2
FLE	Fort Lauderdale East	I-95 & Sunrise Blvd.	306,000	1	622,161	35,129	1	15	2
FLW	Fort Lauderdale West	I-95 & Sunrise Blvd.	306,000	1	622,161	35,129	1	15	2
FLW	Fort Lauderdale West	I-95 & Sunrise Blvd.	306,000	1	622,161	35,129	1	20	2
FLW	Fort Lauderdale West	I-95 & Sunrise Blvd.	306,000	1	622,161	35,129	1	24	2
HOL	Hollywood	I-95 & Pembroke Road	267,000	7	400,065	14,845	8	15	2
JUL ^a	John U Lloyd								2
PMB	Pompano Beach	I-95 & Atlantic Blvd.	224,000	16	384,875	17,875	10	15	2

^a Urban background site.

^b Fleet-equivalent annual average daily traffic (FE-AADT) is calculated using the formula in the EPA's technical assistance document (U.S. Environmental Protection Agency, 2011).

Phase I – Passive Monitoring



Dania Beach (DBH)

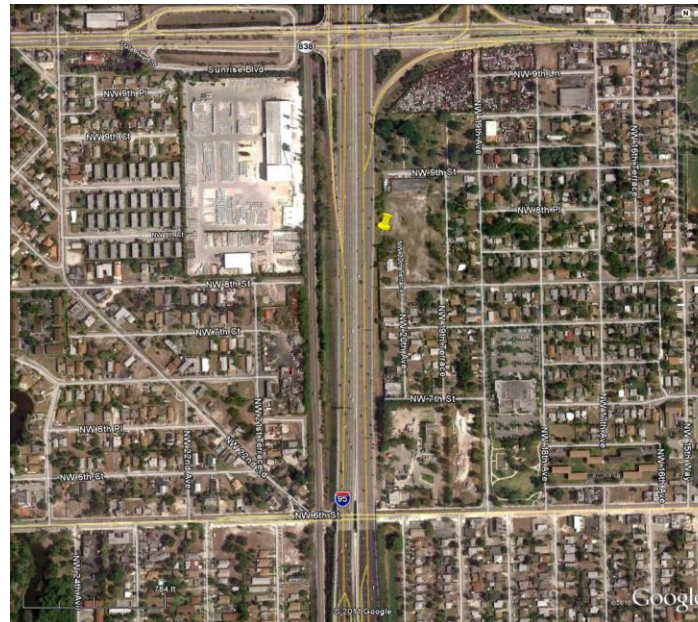


John U Lloyd
(JUL)

Phase I – Passive Monitoring

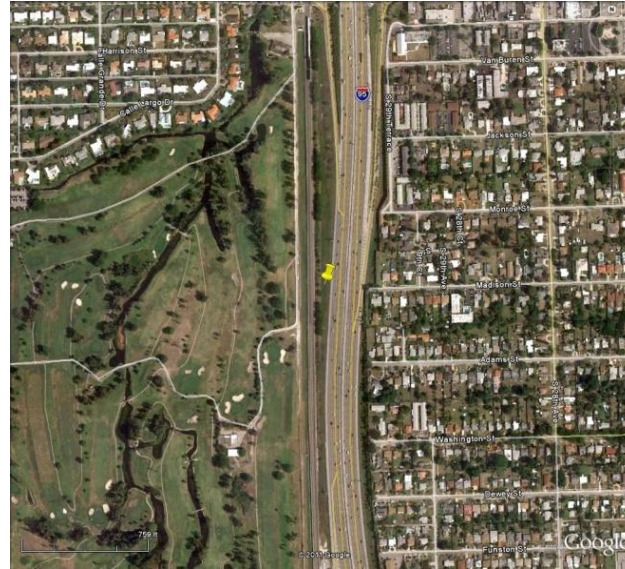


Fort
Lauderdale
West – (FLW)

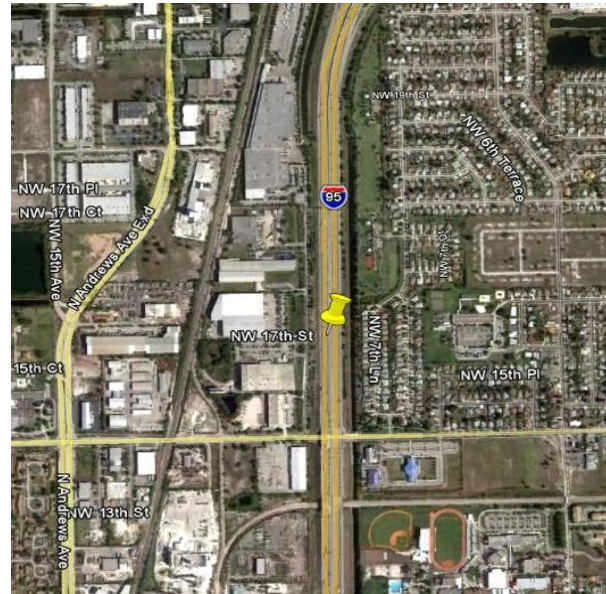


Fort
Lauderdale
East – (FLE)

Phase I – Passive Monitoring



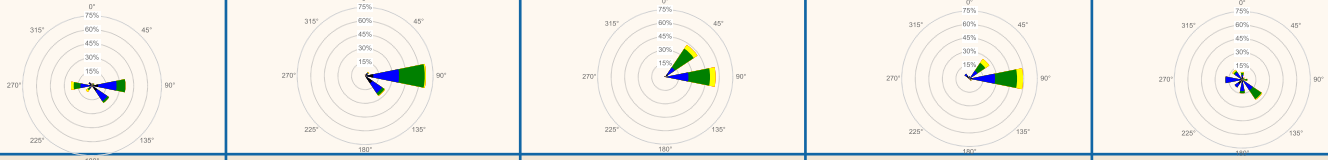
Hollywood
(HOL)



Pompano Beach
(PMB)

Phase I – Passive Monitoring Results

- Final Report is posted on EPA website.
 - <http://www.epa.gov/ttn/amtic/nearroad.html>

Miami		Week 1	Week 2	Week 3	Week 4	Week 5
Wind Rose ^a	<div><div>WS (m/s)</div><div><div>0 - 2.5</div><div>2.5 - 5</div><div>5 - 7.5</div><div>7.5 - 10</div><div>10 - 12.5</div><div>12.5 - 15</div><div>>= 15</div></div></div> 					
Average Temperature ^a (°C)		27	27	28	28	29
Average RH ^a (%)		63	65	64	69	69
Site	Site Image	NO ₂ (ppb)				
DBH		17.1	21.8	14.2	20.9	19.3
FLE		15.4	5.1	3.1	7.2	18.9
FLW ^b		18.4	24.4	14.6	20.3	19.8
FLW ^b		17.4	22.1	14.4	18.4	19.2
FLW ^b		17.2	21.6	14.6	18.7	18.1
HOL		16.0	22.1	15.0	19.4	18.5
PMB		14.8	18.3	11.7	16.4	18.8
JUL		8.6	1.9	2.2	4.6	9.9

Passive Monitoring Data

Summary statistics of weekly average NO₂ concentrations (ppb) at each site.

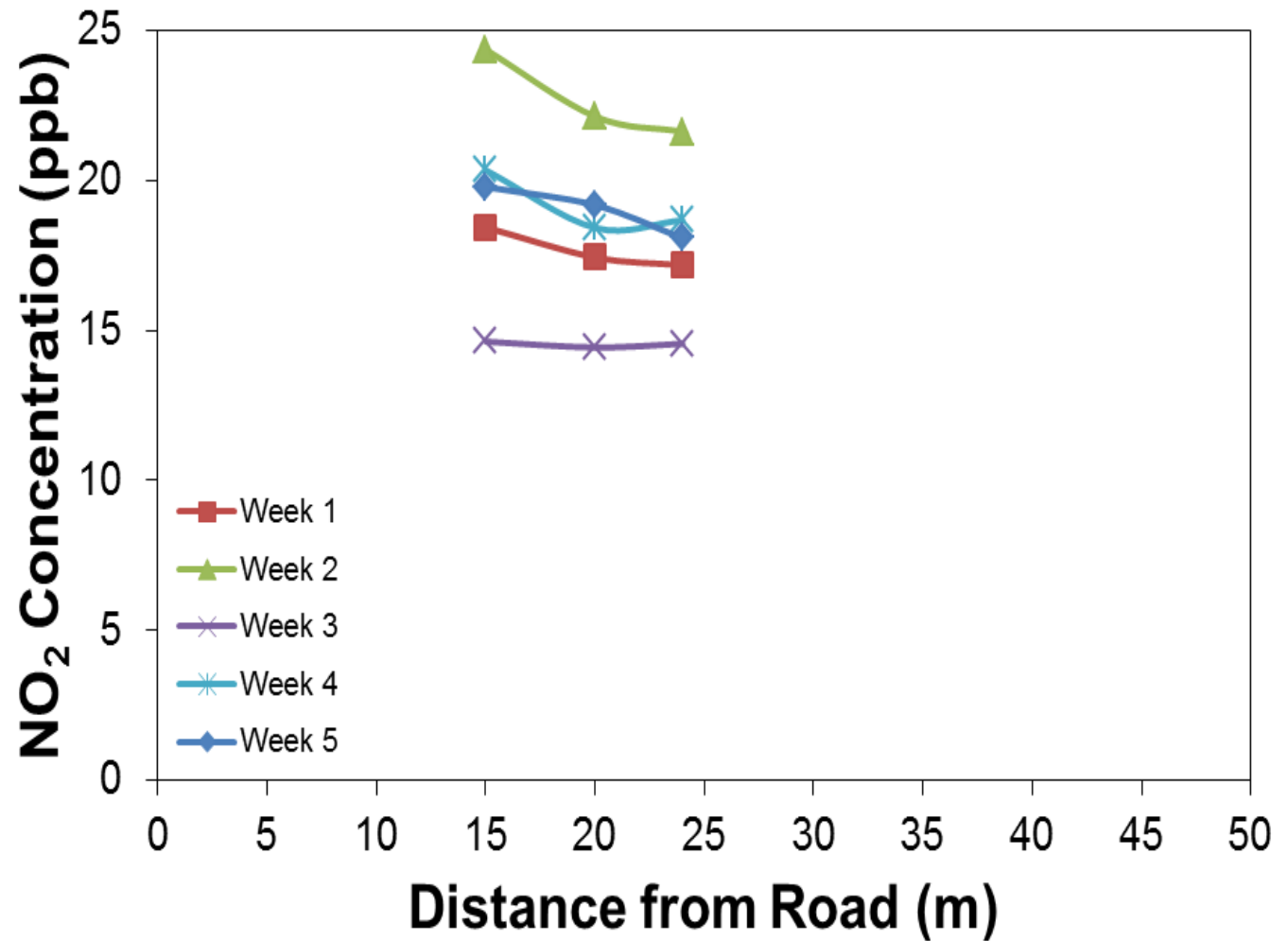
Site	Distance (m)	Height (m)	Min (ppb)	Max (ppb)	Average (ppb)	STDEV (ppb)
JUL			1.9	9.9	5.4	3.6
DBH	15	2	14.2	21.8	18.7	3.1
FLE	15	2	3.1	18.9	9.9	6.9
HOL	15	2	15.0	22.1	18.2	2.8
PMB	15	2	11.7	18.8	16.0	2.9
FLW	15	2	14.6	24.4	19.5	3.5
FLW	20	2	14.4	22.1	18.3	2.8
FLW	24	2	14.6	21.6	18.0	2.6

Passive Monitoring Data

Summary statistics of weekly average NO_x concentrations (ppb) at each site.

Site	Distance (m)	Height (m)	Min (ppb)	Max (ppb)	Average (ppb)	STDEV (ppb)
JUL			3.6	12.2	7.5	4.0
DBH	15	2	19.5	27.0	23.9	2.8
FLE	15	2	5.3	24.3	13.8	9.0
HOL	15	2	17.7	26.7	22.1	3.3
PMB	15	2	15.6	26.3	21.8	4.2
FLW	15	2	18.3	31.8	25.7	5.1
FLW	20	2	18.4	32.3	24.2	5.1
FLW	24	2	19.7	29.4	23.1	3.7

Passive Monitoring Data



Transect data NO_2 concentrations

Phase I – Passive Monitoring

- Best Site Location
 - Sunrise Blvd and I-95
- Meteorology - Important Factor in South Florida
- Ideal probe location within 15-20 meters from roadway

Phase II – Implementing Near-Roadway NO₂ Monitoring Station

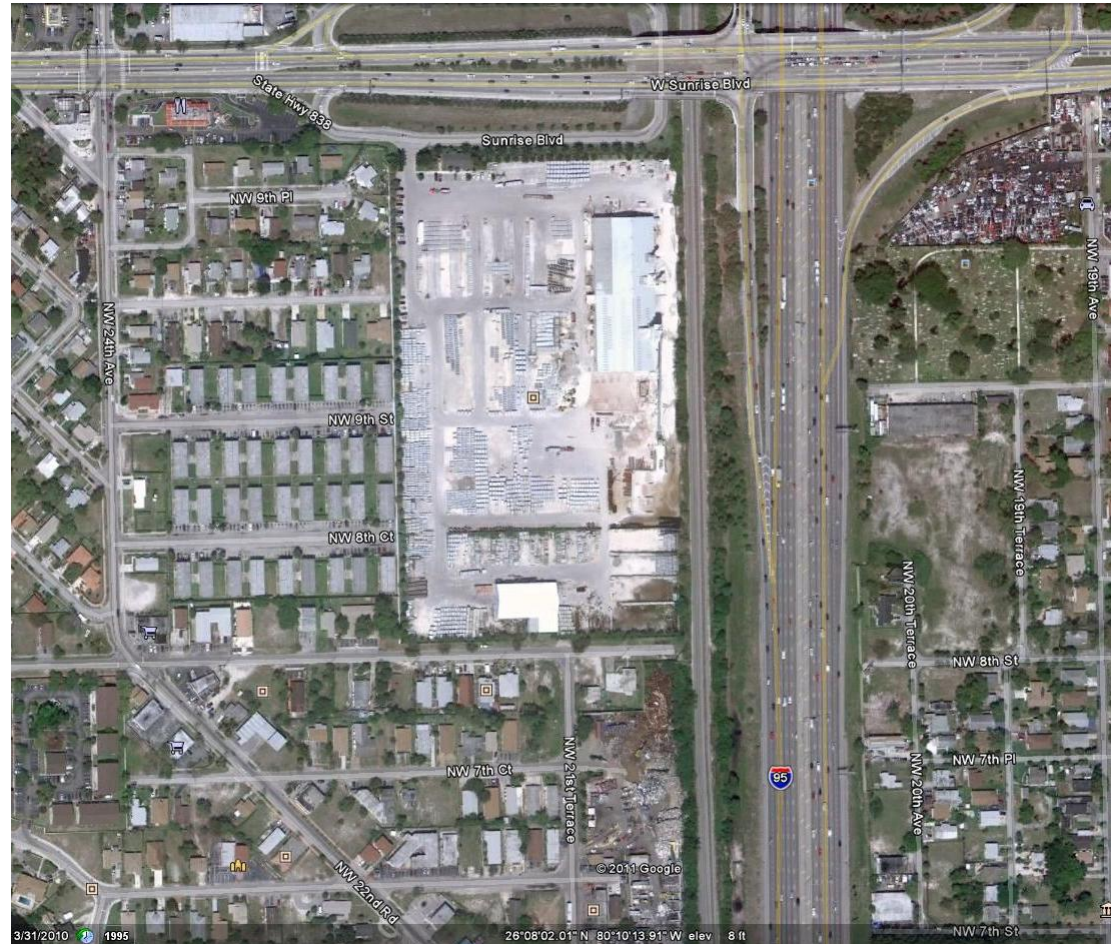
- Boise and Broward
- Multi-pollutant Near Road Monitoring Station
 - NO₂
 - CO_{TL}
 - Black Carbon
 - Ultra Fine Particles
 - Met suite (wind, RH, Temp)

Phase II



Phase II- Near-roadway Monitoring Site

- Highest Traffic Counts
 - Ranked #1 AADT Traffic Counts
 - Ranked #2 HD Traffic Counts
- Space
 - FDOT requires clearance from their clear zone (36 feet).
 - About 100 feet available.
 - Less than 50m siting possible
- Meteorology
 - Site is West of I-95 (winds are predominate out of the east).
- Terrain
 - Flooding possibilities
- Safety
 - Accessible by Sunrise Blvd
 - No barriers



Challenges.....

- FDOT

- Construction Agreement requires a survey and design drawings.
 - 3 month review and approval process

- Purchasing

- RLI for architect to complete survey, drawings and construction agreement
 - Working on RLI since September 2011
 - Currently under review from the County Attorney's Office

Phase II – Permanent NO₂ Monitoring Station

- Completed
 - Site selected
 - Construction Management assigned a Project Administrator to oversee the details
 - Secured Funding and received Commission Board approval
 - Equipment is ordered, most received
- On the table.....
 - Posting of the RLI
 - Selection Committee review of RLI submittal
 - Construction Agreement with FDOT
 - 3 month process after receipt of completed agreement
 - Purchasing – bid for construction of monitoring site

Phase II - Permanent NO₂ Monitoring Stations

- On the table
 - Evaluating connectivity with electric and telecommunications
- Continuing Issues
 - PURCHASING.....PURCHASING.....PURCHASING
- Anticipating Issues
 - Permits
 - Risk Management
 - Time

Take Home Message....

- Plan Early....Plan Early....Plan Early..
- Be Flexible
- Be Patient

Questions...Comments...Suggestions

- Contact Information
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